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Ida

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[54] **BUCKLE ASSEMBLY**

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[73] Assignee: **Yoshida Kogyo K. K.**, Tokyo, Japan

[21] Appl. No.: **116,589**

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[30] **Foreign Application Priority Data**

Sep. 9, 1992 [JP] Japan ..... 4-069373[U]

[51] **Int. Cl.**[5] **A44B 11/00**

[52] **U.S. Cl.** **24/625**; 24/614; 24/616

[58] **Field of Search** 24/614, 630, 663, 664, 24/625, 633, 616, 590, 591, 592, 593, 594, 595

[56] **References Cited**

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63-20334 6/1988 Japan .

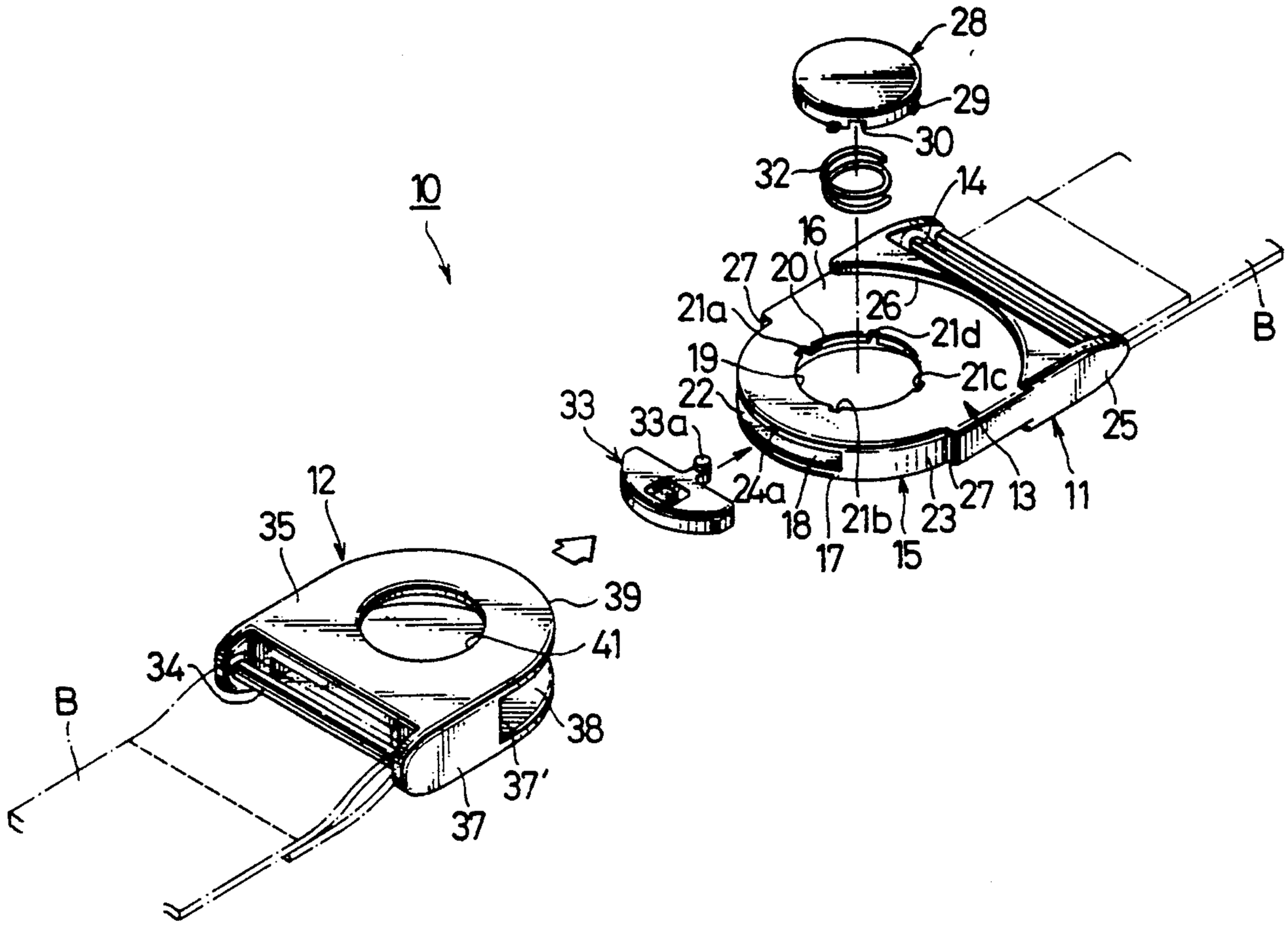
Primary Examiner—Victor N. Sakran

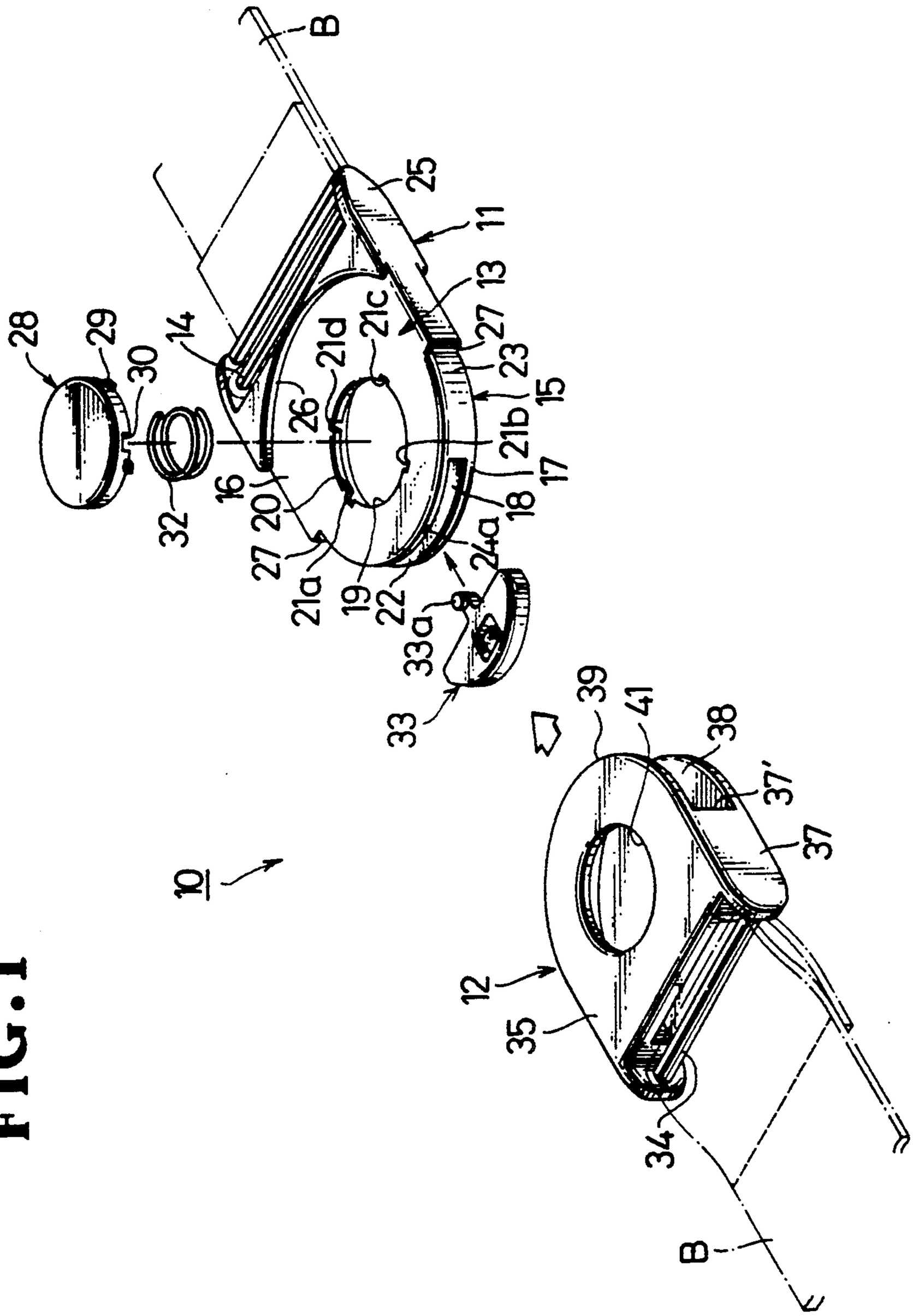
Attorney, Agent, or Firm—Hill, Steadman & Simpson

[57] **ABSTRACT**

A buckle comprises a plug member and a socket member relasably engageable therewith, the plug member including a retainer means in the form of a disc-like collet and a stopper means adapted to hold the retainer means stationery after the latter is rotated into position in the body of the plug member. The retainer means is normally urged upwardly by a coil spring and serves as a fulcrum about which the plug member and the socket member can be moved rotatably relative to each other.

3 Claims, 6 Drawing Sheets

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29
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14
32
16
20
27
21a
19
22
33a
33
10
25
11
13
27
23
15
21c
21d
26
21b
17
18
24a
39
41
38
37'
37
12
35
34
8

FIG. 1

FIG. 2

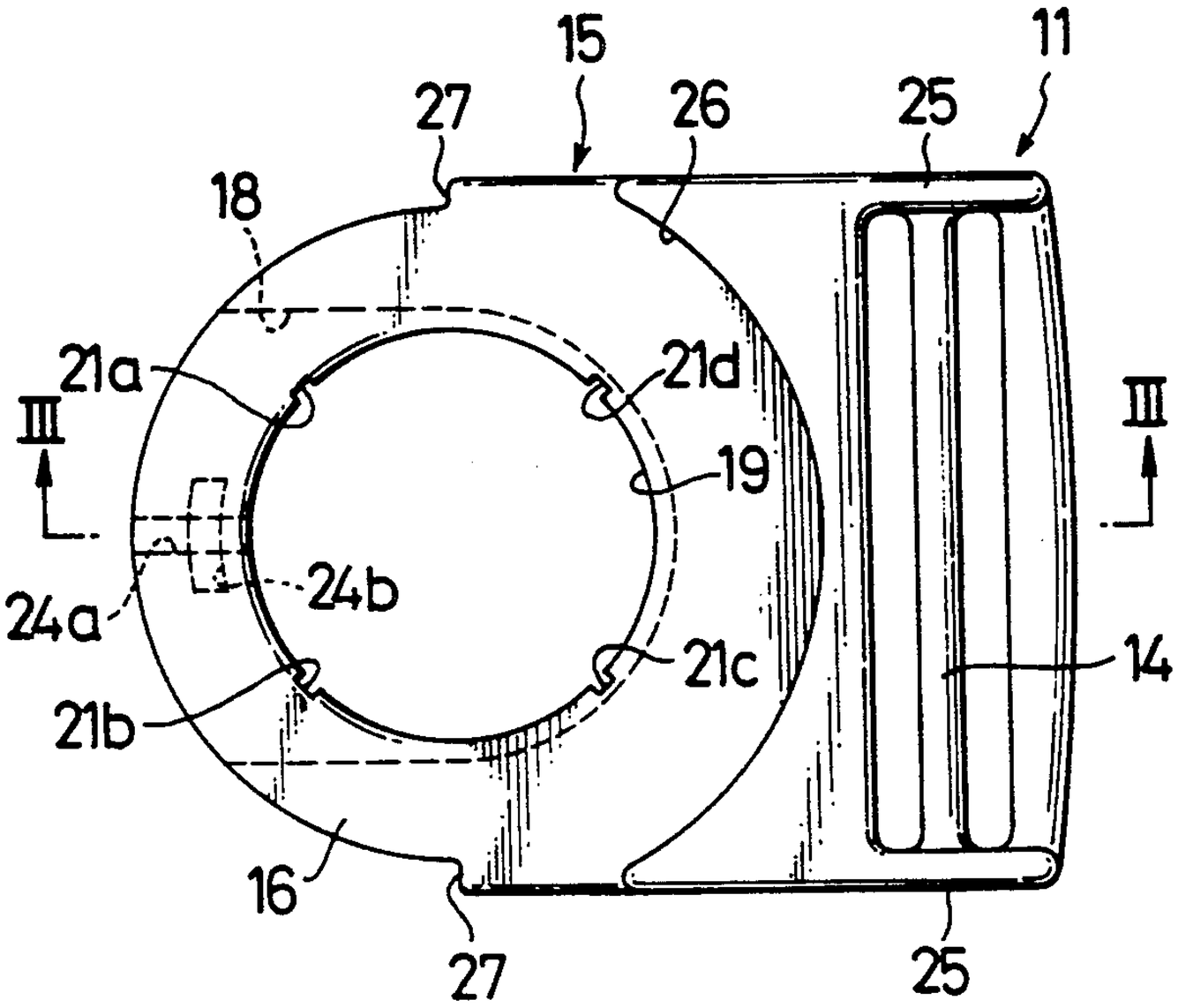

15
11
27
26
25
18
21a
21d
III
III
19
24b
24a
21c
14
21b
16
27
25

FIG. 3

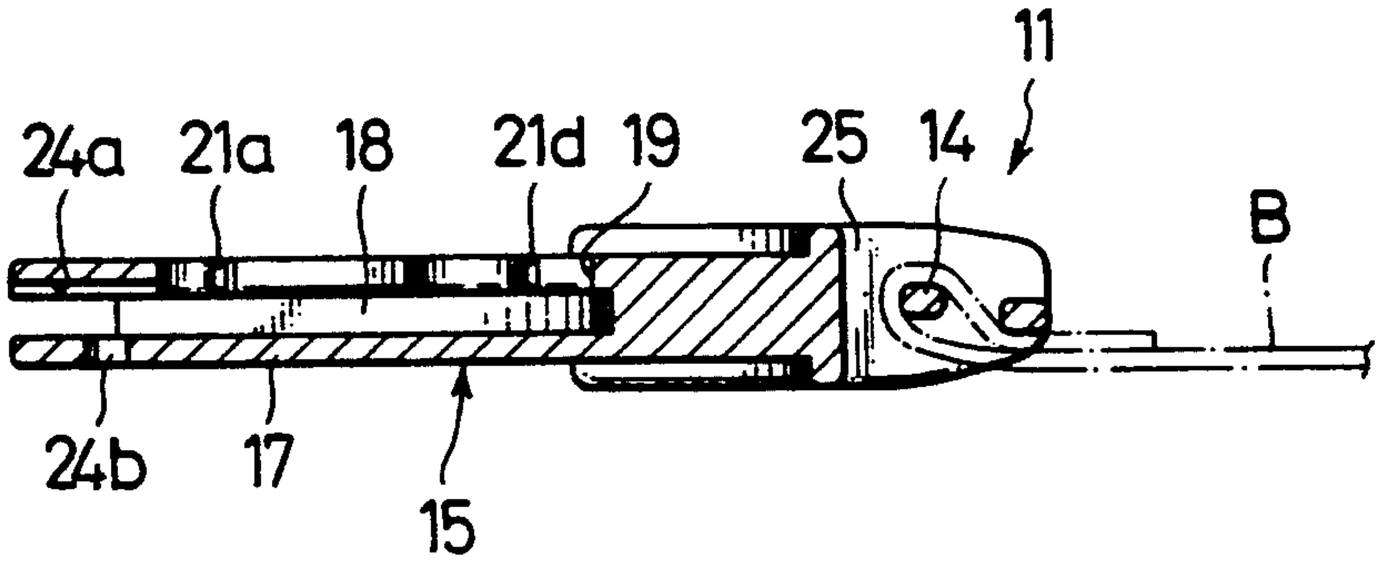
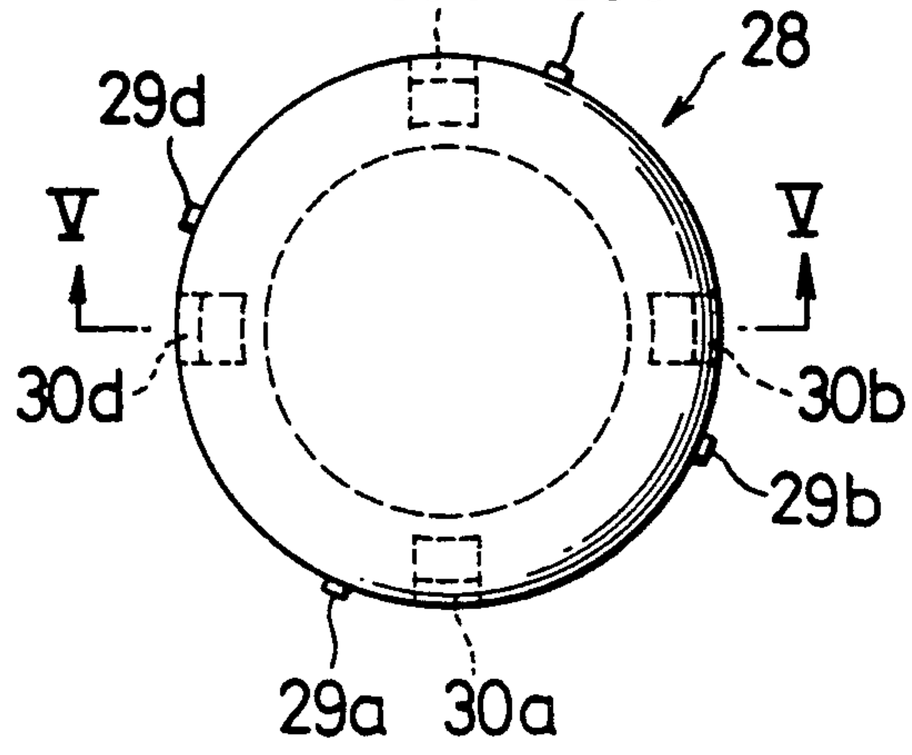

11
24a
21a
18
21d
19
25
14
B
24b
17
15

FIG. 4



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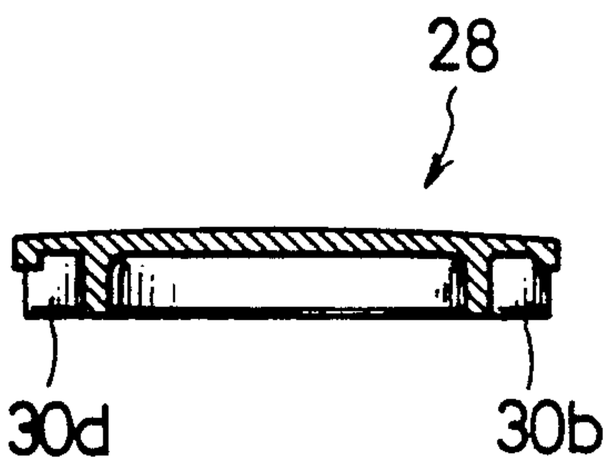


FIG. 6

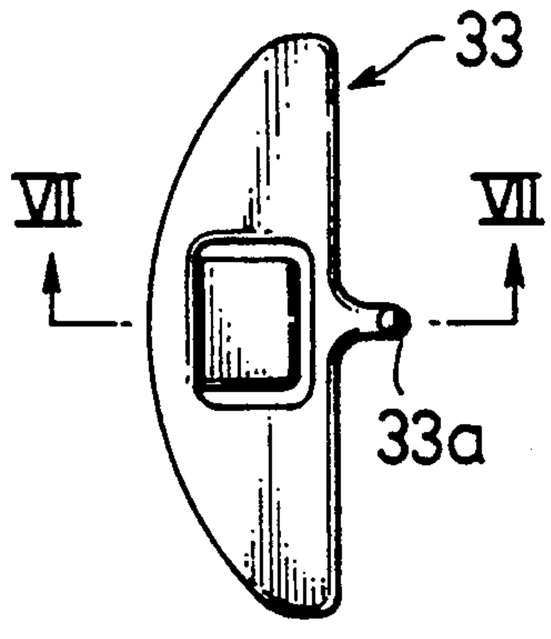


FIG. 7

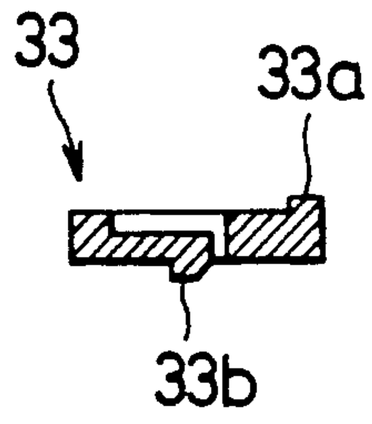


FIG. 8

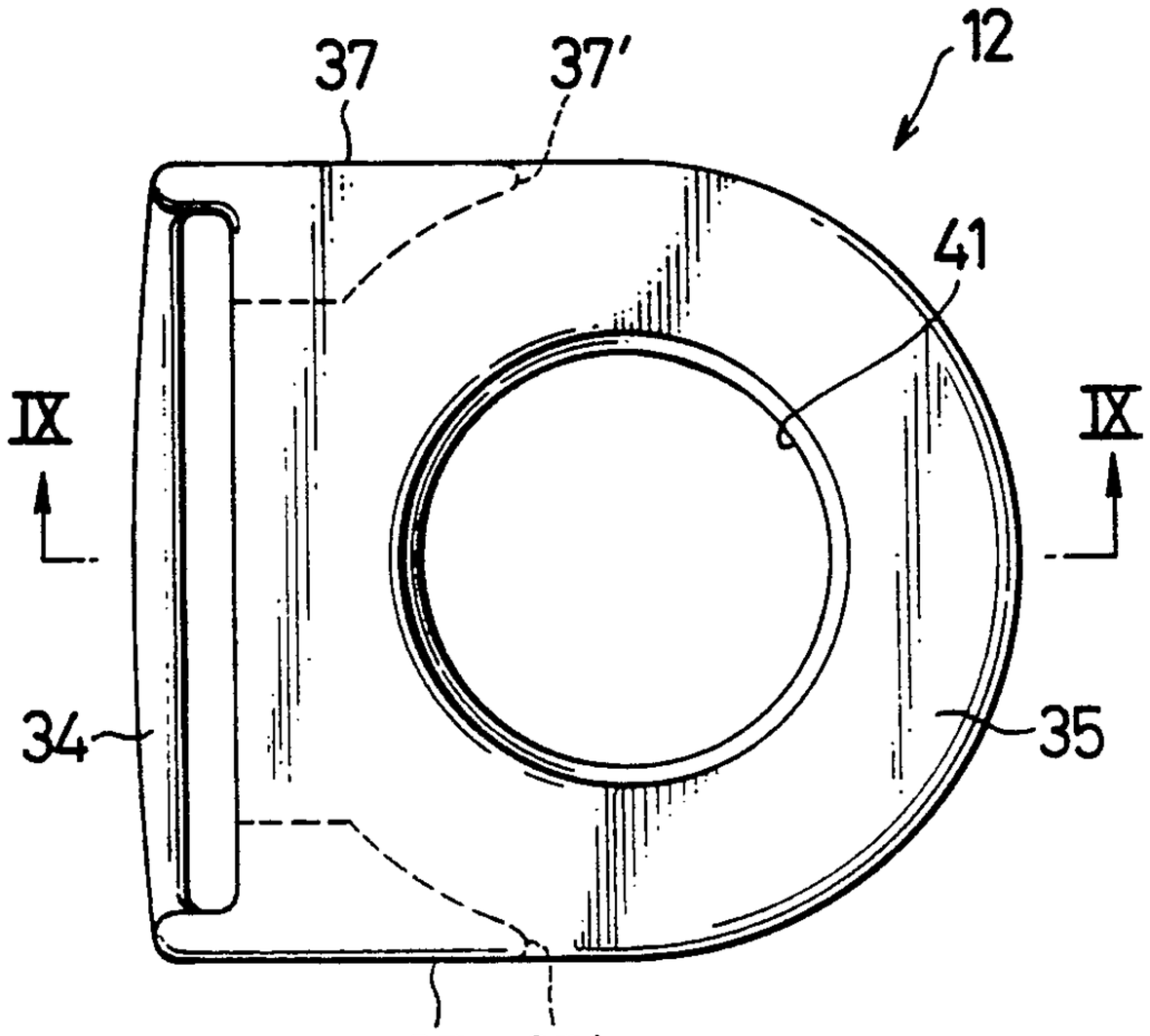


FIG. 9

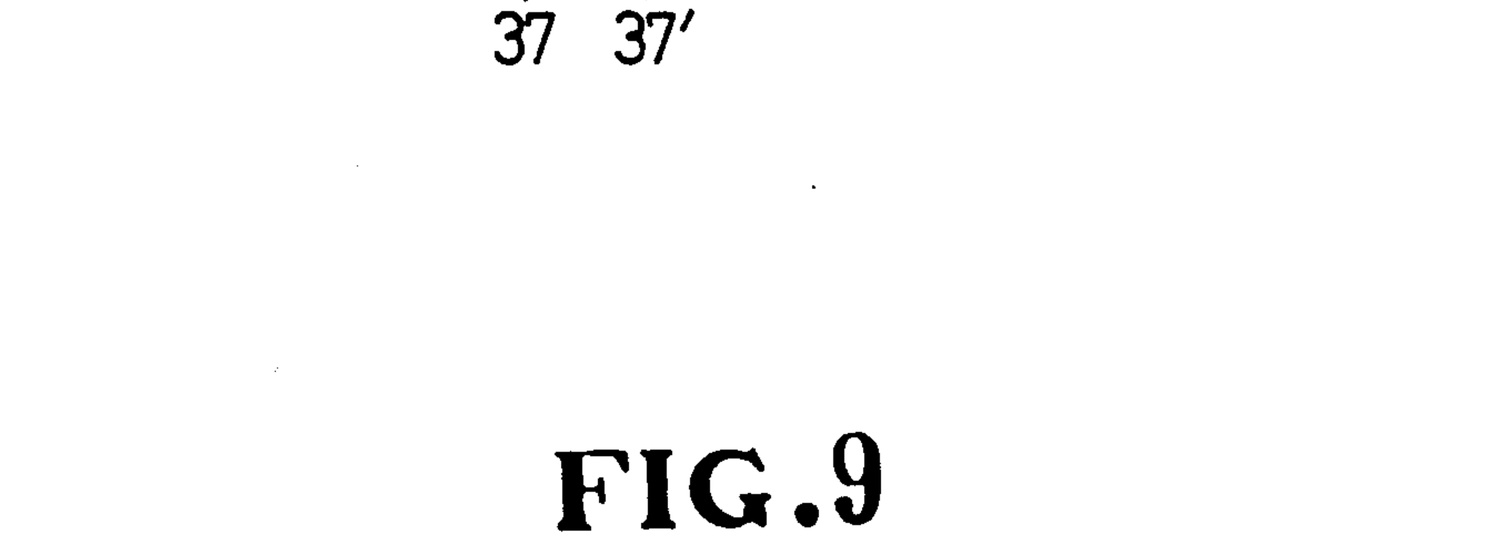


FIG. 10

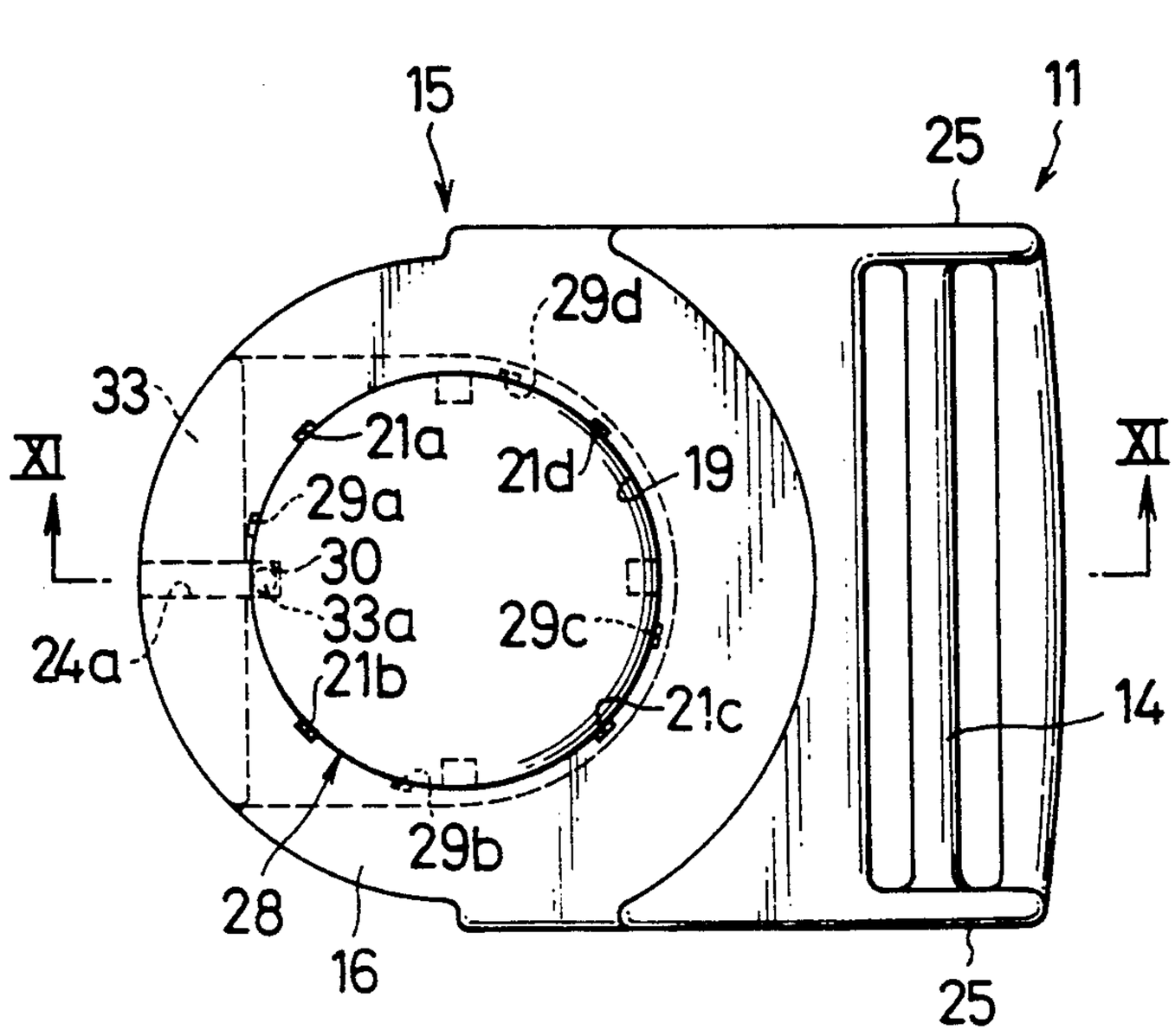

15
11
25
29d
33
XI
21a
21d
19
29a
30
33a
29c
24a
21b
21c
14
29b
28
16
25

FIG. 11

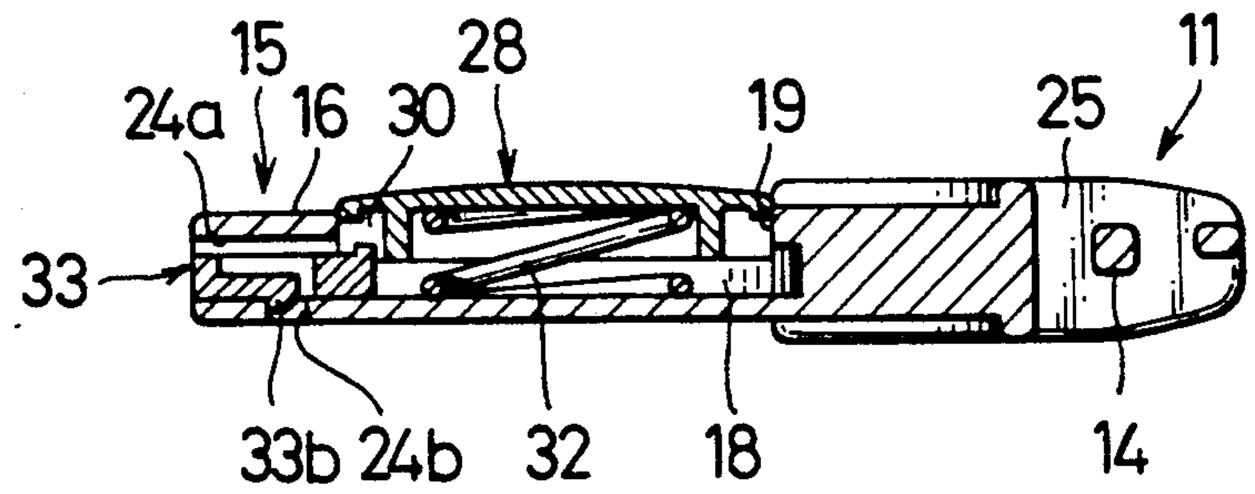

15
28
11
24a
16
30
19
25
33
33b
24b
32
18
14

FIG. 12

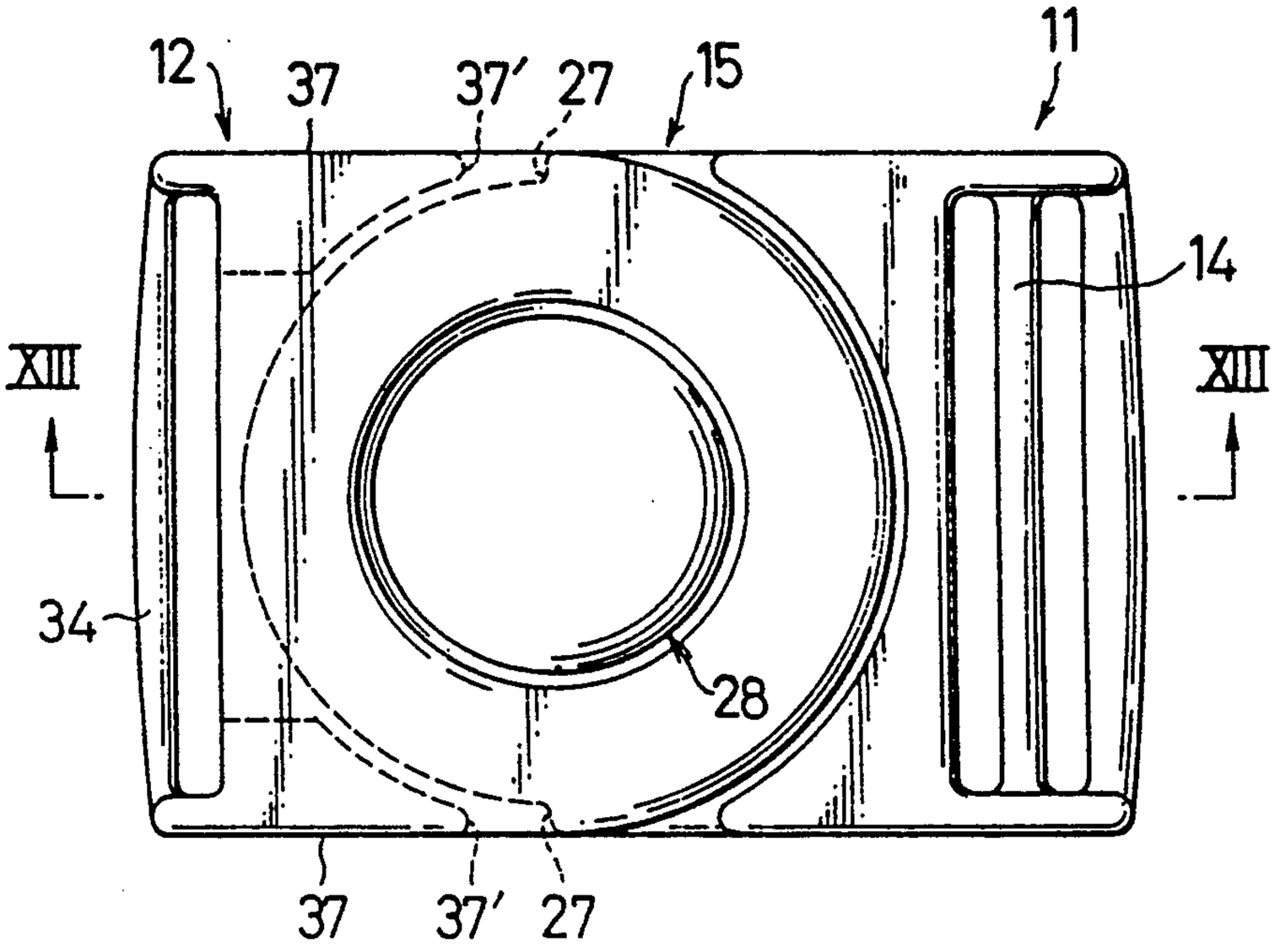
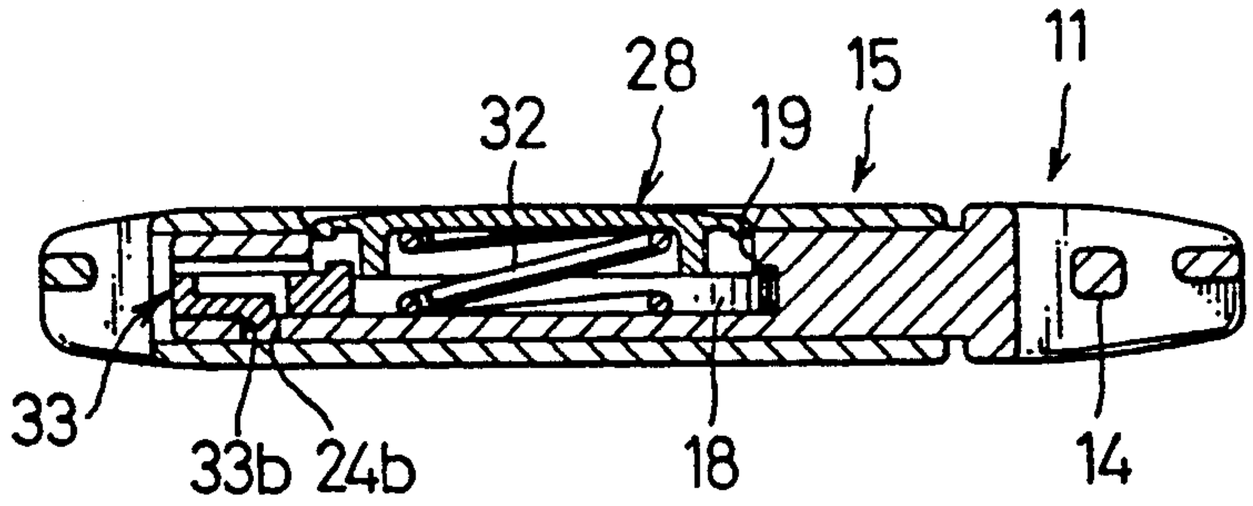

12
37
37'
27
15
11
14
XIII
XIII
34
28
37
37'
27

FIG. 13


28
15
11
32
19
33
33b
24b
18
14

BUCKLE ASSEMBLY

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to a buckle and more particularly a buckle of the type comprising a male member and a female member which are rotatable relative to each other.

2. Prior Art

A typical prior art buckle of the type mentioned is disclosed in Japanese Utility Model Publication No. 63-20334 in which the buckle is made up from a plug member having a resilient engaging tongue integral therewith and a socket member having a circular window dimensioned to receive the tongue. When coupling the two members, the tongue is urged to flex downwardly about an axis defined by a portion thereof connected to the body of the plug member and returns resiliently to its original position upon entry into the window. When separating the two members, the tongue is depressed to sink below the level of the window so that the plug member can be pulled apart from the socket member. Repeated flexing action of the tongue during engaging and disengaging of the plug and socket members over extended periods of time would lead to reduced resiliency or even breakage of the connecting portion between the tongue and the plug body. This problem may be solved by literally increasing the thickness of the connecting portion of the tongue or otherwise reinforcing the same, which would however in turn render the tongue less resilient or pliable, resulting in difficult, if not impossible, manipulation of the plug member relative to the socket member.

SUMMARY OF THE INVENTION

It is therefore a primary object of the present invention to provide an improved buckle which will eliminate or alleviate the aforementioned difficulties of the prior art and which comprises a plug member and a socket member, the two members being so constructed as to ensure mutual coupling and uncoupling with utmost ease and being further movable rotatably relative to each other when assembled.

The above and other objects and features of the invention will be better understood from the following detailed description taken in connection with the accompanying drawings which illustrate by way of example a preferred embodiment. Like reference numerals refer to like or corresponding parts throughout the several views.

According to the invention there is provided a buckle which comprises a plug member and a socket member releasably engageable therewith, the plug member having a circular window and including a retainer means resiliently supported to be movable through the window vertically with respect to the plane of the buckle and a stopper means adapted to hold the retainer means in place against rotation, and the socket member having a chamber dimensioned to receive the plug member and a circular window dimensioned to receive the retainer means movably therein, the arrangement being that the plug member and the socket member are rotatable relative to each other about the retainer means in a plane parallel to the plane of the buckle.

DESCRIPTION OF THE DRAWINGS

FIG. **1** is an exploded perspective view of a buckle embodying the invention;

FIG. **2** is a plan view of a plug member constituting a male part of the buckle;

FIG. **3** is a longitudinal cross-sectional view taken on the line III—III of FIG. **2**;

FIG. **4** is a plan view of a retainer means;

FIG. **5** is a cross-sectional view taken on the line V—V of FIG. **4**;

FIG. **6** is a plan view of a stopper means;

FIG. **7** is a cross-sectional view taken on the line VII—VII of FIG **6**;

FIG. **8** is a plan view of a socket member constituting a female part of the buckle;

FIG. **9** is a longitudinal cross-sectional view taken on the line IX—IX of FIG. **8**;

FIG. **10** is a plan view of the plug member shown assembled with the retainer means and the stopper means;

FIG. **11** is a cross-sectional view taken on the line XI—XI of FIG. **10**;

FIG. **12** is a plan view of the buckle shown with its plug and socket members mounted together; and

FIG. **13** is a cross-sectional view taken on the line XIII—XIII of FIG. **12**.

DETAILED DESCRIPTION OF THE INVENTION

Referring now to the drawings and FIG. **1** in particular, there is shown a buckle **10** constructed in accordance with the principles of the invention, the buckle **10** essentially comprising a plug member **11** and a socket member **12** releasably engageable therewith. The plug member **11** has a body **13** including a belt retainer **14** at one end for retaining one free end of a belt or the like B in a manner well known in the art. The plug body **13** has an engaging tongue **15** in the form of a generally circular disc formed by an upper plate **16** and a lower plate **17** defining therebetween a chamber **18**. A circular window **19** is formed centrally in the upper plate **16** in communication with the chamber **18** and defined by a circular peripheral edge **20** having equidistantly spaced therearound a plurality (four in the illustrated case) of engaging notches **21***a*–**21***d*.

An arcuate inlet mouth **22** is formed in a portion of a peripheral end plate **23** diametrically opposite to and remote from the belt retainer **14** and in communication with the chamber **18**, the end plate **23** connecting between the upper and lower plates **16** and **17** of the engaging tongue **15**. An elongated guide slit **24***a* is formed in the lower surface of the upper plate **16** centrally of the inlet mouth **22**, and a locking aperture **24***b* is formed in the upper surface of the lower plate **17** in registry with the guide slit **24***a*.

The plug body **13** has a pair of flanges **25**, **25** having respective one ends formed integral with the belt retainer **14**, each of which flanges is reduced in thickness from both sides so as to lie flush with the upper and lower surfaces of the upper and lower plates **16** and **17** and consequently provide an arcuate abutment **26** on each side of the engaging tongue **15** adjacent to the belt retainer **14** as better shown in FIGS. **2** and **3**. The flanges **25**, **25** have respective opposite ends terminated to provide end abutments **27**, **27** disposed substantially diammetrically centrally across the circular window **19** of the plug member **11** as better shown in FIG. **2**.

Designated at **28** is a retainer means in the form of a disc-like collet to be mounted through the window **19** for retaining the plug member **11** rotatably relative to the socket member **12** in a manner hereinafter to be described.

The retainer means or collet **28** is provided equidistantly spaced around its periphery with a plurality of engaging ridges **29***a*–**29***d* which register with the engaging notches **21***a*–**21***d* in the window **19**. The collet **28** is further provided with at least one, preferably four engaging recesses **30***a*–**30***d* equidistantly spaced apart but located adjacent to the engaging ridges **29***a*–**29***d*, as better shown in FIG. **4**, for receptive engagement with a stopper means later described. The collet **28** is still further provided at its bottom with a concentric cavity **31** dimensioned to receive and support therein a coil spring **32** when the latter is seated in the chamber **18** of the plug member **11** as better shown in FIG. **5**. The collet **28** has its upper surface preferably rounded off to allow the socket member **12** to smoothly slide thereover.

Designated at **33** is a stopper means which is, as better shown in FIGS. **6** and **7**, a crescent-shaped block having a first locking lug **33***a* projecting upwardly from a linear side of the block for engagement with either of the recesses **30***a*–**30***d* of the retainer means **28** in a manner hereafter to be described, and a second locking lug **33***b* projecting downwardly from the lower surface of the block for engagement with the locking aperture **24***b* in the lower plate **17** of the plug member **11**.

The socket member **12** has a belt retainer **34** at one or rear end thereof for retaining the opposite free end of a belt or the like B in a manner well known in the art. The socket member **12**,being generally complimentary in shape with the engaging tongue portion **15** of the plug member **11**, is formed by an upper plate **35** and a lower plate **36** joined together by a side peripheral flange **37** to define therebetween a chamber **38** dimensioned to receive the engaging tongue **15** of the plug member **11**.

The upper and lower plates **35** and **36** have their respective front ends arcuately shaped as at **39** substantially in conformity with the arcuate abutments **26** of the engaging tongue **15**. The peripheral flange **37** has a portion removed to provide two opposite terminal ends **37'**, **37'** defining therebetween an arcuate opening **40** at the arcuate front ends **39** of the plates **35** and **36** in communication with the chamber **38** for receptive engagement with the engaging tongue **15** of the plug member **11**.

A circular window **41** is formed in the upper plate **35** in communication with the chamber **38**, the window **41** having a diameter substantially equal to or slightly larger than that of the retainer means **28**.

With this construction, the buckle **10** is assembled in the following manner.

The retainer means **28** having the coil spring **32** supported in the cavity **31** is inserted through the window **19** into the chamber **18** of the plug member **11**, in which instance the engaging ridges **29***a*–**29***d* of the retainer means **28** are brought into registry with the mating notches **21***a*–**21***d* in the peripheral edge **20** of the window **19** and the retainer means **28** is then depressed against the tension of the spring **32** until the ridges **29***a*–**29***d* sink below the notches **21***a*–**21***d*, whereupon the retainer means **28** is rotated in either direction to bring one of its engaging recesses **30***a*–**30***d* into alignment with the guide slit **24***a* in the inlet mouth **22** of the engaging tongue **15** as shown in FIG. **10**. The stopper means **33** is now mounted in the inlet mouth **22** with its first locking lug **33***a* guided along the slit **24***a* into that one of the engaging recesses **30***a*–**30***d* which has been aligned with the slit **24***a*, while the second locking lug **33***b* is received into the locking aperture **24***b* in the tongue **15** as shown in FIG. **11**.

This is followed by coupling the socket member **12** with the plug member **11**, in which instance the engaging tongue **15** is inserted through the arcuate opening **40** fully into the chamber **18** until the retainer means (collet) **28** fits into the window **41** of the socket member **12** as shown in FIGS. **12** and **13**. With the plug and socket members **11** and **12** thus coupled together, the terminal ends **37'**, **37'** of the flange **37** of the socket member **12** are spaced apart from the end abutments **27**, **27** of the flanges **25**, **25** of the plug member **11** by a distance over which the two members **11** and **12** are allowed to rotate relative to each other about the retainer means **28** in a plane parallel to the plane of the buckle **10**. This distance therefore can be selected at will to determined the extent of relative rotative movement desired between the plug and socket members **11** and **12**.

Releasing the plug member **11** from the socket member **12** is done simply by depressing the retainer member **28** to sink into the chamber **18** below the level of the window **41** against the tension of the spring **32** so that the plug member **11** can be pulled out apart from the socket member **12**.

Obviously, various modifications and variations of the present invention are possible in the light of the above teaching. It is therefore to be understood that within the scope of the appended claims the invention may be practiced otherwise than as specifically described.

What is claimed is:

1. A buckle which comprises a plug member and a socket member releasably engageable therewith, said plug member having a circular window and including a retainer means resiliently supported to be movable through said window vertically with respect to the plane of the buckle and a stopper means adapted to hold said retainer means in place against rotation, and said socket member having a chamber dimensioned to receive said plug member and a circular window dimensioned to receive said retainer means movably therein, the arrangement being that said plug member and said socket member are rotatable relative to each other about said retainer means in a plane parallel to the plane of the buckle.

2. A buckle according to claim **1** wherein said plug member is provided around the peripheral edge of said window with a plurality of notches, said retainer means is in the form of a disc-like collet having around its periphery a plurality of ridges disposed in registrable relation to said notches and at least one, preferably a plurality of recesses, and said stopper means has a locking lug engageable in one of said recesses.

3. A buckle according to claim **1** wherein said retainer means is normally urged upwardly by means of a coil spring.

* * * * *